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ABSTRACT

The six editions of this newsletter provide a forum for the sharing of research findings and instructional strategies by faculty of Western Michigan University on issues connected with critical thinking. Topics addressed include alternative program designs for critical thinking instruction, a philosophical exploration of what critical thinking is, classroom activities that address critical thinking, teaching large classes, written assignments that address critical thinking, the response journal and the analytic essay, writing in the senior year, and strategies for introducing critical thinking skills. Several of the issues contain a faculty "Exchange Board" in which measures for preventing cheating and plagiarism are shared along with news of interest from the higher education field. References accompany most articles. (JB)

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Instructional Exchange

Volume 3 Number 1 September 1991

Office of University Assessment
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Focus on Critical Thinking

HE 025 405

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Instructional Exchange

Volume 3, Number 1 September 1991

Office of University Assessment
Western Michigan University, Kalamazoo, MI 49008-5767

Focus on Critical Thinking

It's difficult not to favor development of Critical Thinking in our student body. If that's as far as we had to go in the discussion, we wouldn't have any problem. But when we agree to the development of Critical Thinking, action statements about instruction programs must inevitably follow. Faculty are less likely to agree on action statements. If the series of questions below follow the initial unanimous assent, we may find where opinion diverges within the faculty. The questions are: What is Critical Thinking? How do we know where we are in its development? What should we do instructionally to enhance it?

Instructional Exchange will focus on Critical Thinking this year. We hope that we are evenhanded in presenting the various sides of the issues but trust that faculty will use the *Exchange Board* or submit short articles to present various sides in the discussion. We begin this month with a presentation of the various meanings of Critical Thinking on the interior pages of this issue.

The literature on Critical Thinking has grown enormously in the last ten years. Some of the impetus for growth came from state departments of education which set statewide goals at the K-12 level that called for development of higher order thinking skills as opposed to knowledge of specific facts. Professional organizations have worked to come to consensus on the meaning. Educational researchers have engaged in discussions of Critical Thinking as a general ability or as specific aspects of knowledge within the subject matters. Measurement specialists have tried to develop new ways of testing for Critical Thinking so as to isolate it from either intelligence or reading ability. Selecting a definition of Critical Thinking may not be an easy task.

October will present the various programmatic instructional strategies used or promoted to enhance Critical Thinking. The remainder of the academic year will be devoted to classroom strategies discussed in the literature of the discipline. This is the first time we will publish disciplinary issues, i.e., Social Sciences, Natural Sciences, the Humanities and Arts, and the Professions. The material will be gleaned from *Teaching of . . .* journals. Our guess is that the material, while originally published for specific disciplines, will have application in a broad array of classrooms.

In response to the year-end questionnaires, we have changed page 4 of *I/X*. Each issue will contain a short list of cheating prevention hints. The problem of cheating was mentioned by a number of respondents. The *"Did you know?"* article will cover a number of topics during the year. It is designed to respond to requests for information that is more national and data-oriented in nature. Our thanks to the readers who took the time to offer suggestions for this volume.

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What Others say about Critical Thinking.....

Quoted below is a part of the consensus statement developed by the Committee on Pre-College Philosophy of the American Philosophical Association using the Delphi technique. The panel of experts used to develop the consensus statement consisted of 46 persons from a wide range of fields who had special interest and expertise in Critical Thinking.

We understand Critical Thinking (CT) to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. CT is essential as a tool of inquiry.

While not synonymous with good thinking, CT is a pervasive and self-rectifying human phenomenon.

The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. (p. 3)

***Norris (1989)* considers the consequences of beliefs about Critical Thinking on the problems of measuring Critical Thinking. Norris is a supporter of a definition of Critical Thinking as a generic ability.**

The expression 'the generalizability of Critical Thinking' has at least two senses – an epistemological sense and a psychological sense.... (p.21)

According to epistemological generalizability, there are principles and standards of Critical Thinking that are applicable to many subjects.... An intuitive case can be made for each side of the issue. In favor of epistemological generalizability, the principle of inductive reasoning seems widely applicable....On the other side, it seems plausible that the standards for determining knowledge might differ from mathematics, to social science, to archaeology, to law....(p. 21)

If epistemological generalizability is correct, good performance [on a test] would be evidence that the student knows the Critical Thinking principles and standards for distinguishing strong and relevant arguments from weak and irrelevant ones, whatever the content of the arguments....If epistemological generalizability is incorrect, then the inference that the student has Critical Thinking abilities needed to evaluate arguments in subjects other than those examined on the test would not be sanctioned....(p.22)

Psychological generalizability is the view that people actually apply Critical Thinking learned in one subject to thinking in another....(p.22)

Normative theorists of Critical Thinking claim that to be a critical thinker one must have both abilities and dispositions. Critical thinkers are disposed to seek reasons, try to be well informed, use credible sources and mention them, look for alternatives, consider seriously points of view other than their own, withhold judgment when the evidence and reasons are insufficient, seek as much precision as the subject permits, among other activities. (p.22)

***Ennis (1989, 1990) and McPeck (1990a, 1990b)* are used here to show differing points of view concerning the issue of Critical Thinking as a general ability or an ability which is subject specific.**

Ennis defines Critical Thinking as reasonable reflective thinking focused on deciding what to believe or do... other concepts of Critical Thinking include the correct assessing of statements, the propensity and skill to engage in an activity with reflective skepticism. Other concepts of thinking related to Critical Thinking are higher order thinking, problem solving and metacognition. (1989, p.4)

McPeck, on the other hand, criticizes the definition of a generic Critical Thinking. He argues that Critical Thinking, like any thinking, is necessarily connected to particular objects of thought. Because objects of thought can and do differ enormously in scope, quality, and variety, no one general skill or limited set of skills (including formal logic) could do justice to

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Editor: Mary Anne Bunda Managing Editor: Marcia Mascolini Production Editor: Jie Gao

this wide variety of objects. (1990a, p. 11)

Domain (or subject) specificity in Critical Thinking requires three principles, according to Ennis:

1 Background knowledge is essential for thinking in a given domain.
2 Simple transfer of Critical Thinking dispositions and abilities from one domain to another domain is unlikely.
3 General Critical Thinking instruction is unlikely to be effective. (1989, p.5)

Ennis refutes the principles with:

1 An experienced person can become in a way so well informed about and embedded in an area that he or she stops thinking, becoming inflexible and, for example, unable to conceive of and consider alternatives. Subject-matter knowledge often consists of a mass of rote-memorized subject matter that is not understood deeply enough to enable a student to think critically in the subject.
2 If the domain-specificity transfer principle is correct, immersion in a subject matter area, which, let us assume, includes ability to think in the area, probably will not lead to Critical Thinking in everyday life, because immersion is not accompanied by explicit attention to general principles of Critical Thinking. (1989, p.6)

McPeck responds that school-subject knowledge is not isolated from, nor distinct from, nor irrelevant to everyday life. In fact, school subjects had their historical origins in everyday life, and this is what they continue to be about no matter how theoretical the study might become at times. The dichotomy that Ennis creates between everyday life and school-subject knowledge is a false dichotomy; it misrepresents the nature of the transfer question. (1990a, p. 11)

McPeck (1990b) argues that the general skills approach to Critical Thinking represents a classical tradeoff. In its effort to maximize the number of areas to which its general principles apply, this approach perforce sacrifices genuine effectiveness in all of them. (p. 14) He suggests that the disciplines contain the critical dimensions for understanding complex concepts and information. Further, patterns of reasoning are peculiar to a given discipline. (p. 17)

***Kurfiss (1989)* takes a stand which promotes Critical Thinking as a discipline-bound skill, which has some common elements across the disciplines.**

Critical Thinking is the process of figuring out what to believe or do about a situation, phenomenon, problem or controversy for which no single definitive answer or solution exists. The term implies a diligent, open-minded search for understanding, rather than for discovery of a necessary conclusion.... The particular content, form, and standards of reasoning involved in Critical Thinking vary by discipline. For example, social scientists search for causes of problems, to understand them and provide a basis for solutions. Literary critics examine textual or biographical evidence and the cultural context of a work, to help them develop an interpretation. In spite of clear differences among the disciplines, common elements of reasoning exist. Critical Thinking in all disciplines involves both discovery and justification of ideas. In the discovery phase, we examine evidence in search of patterns and formulate interpretations or hypotheses about what the evidence means. In the justification phase, we set forth our conclusions, reasoning, and evidence in an argument. (p.42)

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EXCHANGE BOARD

Waiting for comments

Did you know?
News in Higher Education

After years of development the ACT Company has issued a new test to be used as an entrance examination for postsecondary schools. Complete change over from the old form started in October, 1989. The new test was initiated by requests from colleges and universities for information that would be more helpful in course placement. The test concentrates more on achievement in basic skills. The scores on the new test are English (subscores in Usage/Mechanics and Rhetorical Skills); Mathematics (subscores in Pre-Algebra and Geometry); Reading and Science Reasoning.

The major change, as reported by the ACT Company, is the inclusion of a "pure" reading scale, subscores in both English and Mathematics designed to facilitate placement decisions, and the Science Reasoning scale which includes achievement items as well as inferential or reading items. The Social Science subscore has been deleted from the test. Research on the use of the new instrument is in the preliminary stages.

Help in Writing

The Academic Skills Center offers tutoring in writing for undergraduate students only. The Writing Lab is located in 1039 Moore Hall. Students may be referred for writing help in two different ways: a professor referral or self referral. The referral may result in a regular one- to two-hour-a-week tutoring session or a drop-in session. However, students should be aware that appointments must be made a week in advance for drop-in sessions. Tutoring is available from September 16 to December 6. Tutors can work with students on redrafting papers for any class.

The lab hours are 8:00 am to 8:00 pm Monday through Thursday and 8:00 am to 5:00 pm on Friday.

If you have any questions, call 387-4442.

Prevention Tips

1. **The** professor should give **concrete** examples of plagiarism. Much plagiarism is intentional, but at times students simply may not know that they are cheating. Students who have had very little experience with writing papers find it hard to produce material that is appropriately cited, particularly if material has been presented in more than one source. Using some citations in your lectures will help students understand the concept of appropriate citation.
2. **Never** accuse a student of cheating in front of other students. Peer pressure will often cause a student to deny the accusation when a private meeting would have produced a remorseful admission.
3. **Set** the rules for test taking in the classroom early in the semester. If students are not permitted to leave during a test, have a plan for a student who actually becomes ill during a test. Alternatives may include taking a make-up examination on a specified date, having a grade based on a smaller number of examinations, or being graded only on the portion of the test which was completed. If students are required to come to class with only a pencil or pen, be prepared for some students to arrive with notebooks and textbooks. Arrange an area in the back or front of the classroom for the storage of these materials.
4. **Do not** leave the room during a test. Move around the room quietly at irregular intervals.
5. **Documentation** or evidence of cheating is very important and sometimes very difficult to obtain. Crib notes used during a test should be secured. However, if the notes are on the brim of a hat, the student may not give up his or her property. Other evidence may be more easily secured. Copies of answer sheets (both the guilty and the innocent parties') should be kept in a file and diaries of contact with the student should be kept. When plagiarism is the charge, try to photocopy the original source for the file as well.

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Instructional Exchange

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Alternative Program Designs for Critical Thinking Instruction

The development of an instructional program designed to teach Critical Thinking depends to a large extent on what you believe about Critical Thinking, i.e., whether it is a set of skills that can be generalized across disciplines or whether it is a trait that is discipline specific.

Ennis (1989) described four general models or approaches to teaching Critical Thinking based upon 1) Whether the general principles of Critical Thinking were made explicit during instruction and 2) Whether the content matter of the course was the standard content matter of the discipline or whether it was enhanced by another field of study.

He suggests that there are four models.

General Critical Thinking instruction is self-contained in a single course such as informal logic or reasoning skills. The rules or principles of Critical Thinking are explicitly provided during instruction. The application topics may be discussed in abstract terms only or may be presented with concrete examples from previously learned content in the disciplines, or in national political issues or current events.

Infusion program design has no course specifically dedicated to the development of Critical Thinking, but courses within the disciplines are revised to explicitly develop Critical Thinking. In addition to the regular content matter, the revised courses make explicit the general principles of Critical Thinking. Except for the explicit presentation of the general principles of Critical Thinking, no content from an outside discipline is used.

Immersion program design to Critical Thinking assumes that the principles of Critical Thinking are subject specific. Thus, no general principles are explicitly presented. Rather, the rules of evidence and argument within the discipline are presented as a normal part of the coverage of the content within the discipline. No effort is made to compare different systems. The instruction in the language and thought of the discipline may use less didactic pedagogy, i.e., less lecture and more discussion.

A Mixed approach consists of a combination of both the general course and the infusion or immersion approaches. If the combination is of the general and the infusion models, care must be taken in presenting the principles to guarantee articulation across courses. If the combination is of the general and the immersion models, care must be taken to point out the differences in the rule systems within the disciplines and those presented as part of a general course.

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Instructional Delivery Systems at a Glance

The General Model

The general approach would require students to take a course in Critical Thinking. If the conception of Critical Thinking is abstract, the course would be taken early in a student's academic career with the content dedicated solely to informal logic. Most probably the course would be offered by the Philosophy department.

Other courses could be designed to include subject matter knowledge in the material of the course. Concrete components or applied components often require that the course be offered at the junior or senior level so that the student has an opportunity to learn material from the disciplines.

The exact characteristics of the course are determined by the offering department. Many professional organizations have developed model courses and there is a selection of textbooks in the area. The National Endowment for the Humanities supported the development of a model Critical Thinking syllabus for a writing course which covers such topics as evidence, argumentative rhetoric, and semantics. (Lazere, 1982)

The Immersion Model

John McPeck has argued that Critical Thinking can best be developed in students by learning in each of the disciplines. He suggests that courses on thinking skills concentrate on the process of reasoning which inefficiently generalizes to all subjects. Although the process of reasoning is important, so that students are not taken in by faulty arguments, weak evidence, or "trendy" opinions, his view is that the standard disciplines already contain a major portion of the content in these courses.

"Reasoning skill is not something different from, or over and above, disciplinary thinking,. . . but is in fact part and parcel of disciplinary thinking." (McPeck, 1990, p. 34) He suggests that thought and meaning are dependent upon learning the language of each of the disciplines. "Through the use of their general concepts, and rich language, the disciplines provide a very powerful set of analytic lenses through which students can come to understand problems, and to grapple with them in rational ways. Indeed, what it means to be rational is to make decisions on the basis of the available evidence. And since people are not born knowing what evidence might be relevant, they must be taught." (p. 40)

The fact that McPeck does not support independent instruction in thinking skills does not mean that he believes Critical Thinking is now being developed or that it can be developed in each of the content areas.

"However, the first thing teachers must do is to get a clearer fix on the structure of their disciplines, and to use that as the core of their curriculum.... In addition to being clear about what one is trying to teach, there remains the question of how one should teach the structure of a discipline. It is here, I believe, that the major failing of the disciplines is to be found. Even in those cases where the structure of the discipline has been the core of the curriculum, the method of delivery has been anathema to critical thinking." (p.50)

"In some subjects, we are simply (and appropriately) trying to train students how to do it. Thus, there is little room for critical thinking in some cases. This is not to say that these subjects do not allow critical thought, but simply that it is not the appropriate focus." (p.51)

Richard Paul (1990) indicates "At the root of the problem is McPeck's (unwitting?) commitment to a rarefied form of logical (epistemological) atomism, a commitment which is essential if he is to rule out, as he passionately wants to, all general skills of thought and so to give himself a priori grounds to oppose every and all programs that try to develop or enhance such skills.. . . From a logical atomist's point of view, dialectical, multicategorical questions are anomalous. When noticed, the tendency is to try to fabricate specialized categories for them or to break them down into a summary complex of monocategorical elements... This neat and tidy picture of the world of knowledge as a specialist's world is the Procrustean bed that McPeck has prepared for critical thought." (pp.103-105)

"Not only conceptualizing 'things' but most especially classifying what we have conceptualized, are not matters about which we can give the final word to experts and specialists.... We need to pay special

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attention to those general skills of critical cross-examination, for they are what enable us to maintain our autonomous judgment in the midst of experts." (p. 108-109)

The Infusion Model

Some individuals who believe that Critical Thinking is a single skill also believe that the skill can and should be taught across the curriculum. "Teaching students thinking skills across the curriculum need not involve compromising regular course content. Though some time will usually be required to introduce or reinforce the principles and approaches of effective thinking." (Ruggiero, 1988, p. 153) When the instructional program is organized to develop, enhance or reinforce the skill in all courses, merely indicating that Critical Thinking is an objective of the course is not enough. Review of courses expressly investigates the activities used to insure that Critical Thinking improvements occur. Often these exercises develop skill-clusters which are components of Critical Thinking.

Some activities which Ruggiero (1988) suggests are:

1. Examining Thought Patterns or thinking about thinking.
2. Tracing Sources of Beliefs
3. Tracing the Consequences of Ideas
4. Identifying Problems and Issues -- rather than recalling the problems and issues which have been presented in the lecture or identified in the textbook.
5. Anticipating Objections
6. Recognizing Fallacies
7. Analyzing Dialogues -- Dialogues are prepared by the faculty members where each side of an issue can be represented and the student can not only investigate the efficacy of the evidence used in the dialogue, but also the logic of the argument presented by each side. Thus, the exercise strengthens the ability to analyze the logic of an argument and the criteria for evidence in a particular field.
8. Recognizing Fallacies -- The use of these activities implies that the course has specifically taught such fallacies as faulty analogy, faulty causation, irrelevant or irrational appeal, overgeneralizations, oversimplification, or shifting the burden of proof.

The Mixed Model

The mixed approach consists of a separate course in the general principles of Critical Thinking supported by instruction in subject-specific Critical Thinking instruction within the disciplinary courses. This approach requires articulation across the general principle course and the subject-specific components.

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EXCHANGE BOARD

Waiting for Comments

The Chronicle of Higher Education Almanac published on August 28, 1991, had a number of state by state comparisons.

The Michigan high school dropout rate in 1988 was 26% compared to 42% in Florida and 9% in Minnesota. Other states with a 26% dropout rate were Maine, Maryland, and Missouri.

The number of high-school graduates is projected to increase by 4% between 1991-92 and 2001-02, as opposed to an increase of over 40% in California, Florida, and Arizona and more than 80% in Alaska.

57% of the high-school seniors attempted the ACT test. The average score for Michigan was 18.6 compared with a national average of 20.6. Interpretation of the state average requires consideration of the percentage of seniors who attempted the test as well as the average itself. For instance, 53% of the high-school seniors in Alabama attempt the test with an average of 17.0, whereas 36% of the high-school seniors in Arizona attempt the test with an average of 19.0. The estimate of the mean with most college-bound students participating in the program is better than when only a fraction of the college-bound students participate.

Help in Writing

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Coping With Cheating

Sometimes, students cheat because they do not understand that particular behaviors constitute cheating, or they refuse to accept common definitions of cheating. Many students seem confused as to what actually constitutes cheating. Faculty and students rate behaviors as honest or dishonest differently. However, there is no consensus even among faculty on various kinds of cheating behavior. Some faculty choose to label minor infractions as something other than "cheating". It may be that differing standards of academic integrity among faculty result in mixed and confused messages to students with respect to cheating behaviors. The following are some types of behavior students may not realize constitute cheating, or some faculty may not rate as cheating (Raffetto, 1985):

*Getting questions or answers from someone who has already taken the same exam.
*Copying answers from a source without doing work independently.
*Copying a few sentences without footnoting in a paper.
*Working on homework with other students when the instructor doesn't allow it.
*Padding a few items on a bibliography.

Faculty should indicate in advance the policies and procedures for handling cheating. Faculty must reach a consensus on cheating behaviors and students must be aware of the policies and procedures. (Loeher, 1984) Sometimes faculty discover cheating behaviors, but they take no action to handle them. This might indirectly encourage the cheating behavior.

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Instructional Exchange

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Critical Thinking[1]

by
Michael S. Pritchard

There is widespread agreement among educators that we need to do a much better job helping students develop their critical thinking abilities. Many cite lowered scores on standardized reading and math tests as evidence of this need. Others simply note their student's difficulties in engaging in thoughtful, reflective discussion and in writing organized, well argued essays.

It might be thought that these two kinds of supporting evidence should point educators seeking to improve critical thinking in the same direction. Perhaps they should, but, in fact, they do not. Beneath the surface of agreement about the need for critical thinking are striking differences about just what critical thinking is. This is acknowledged by leading advocates of critical thinking. Without at least a rough consensus on what critical thinking is, they urge, confusion about what is needed and what might count as educational success or failure in this regard is inevitable.

So, what is critical thinking? Robert Ennis (1987) offers the following succinct definition:[2]

> "Critical thinking," as I think the term is generally used, means **reasonable reflective thinking that is focused on deciding what to believe or do.** (p. 1)

This definition has several virtues. First, it is concise. Second, it identifies reflection as a key ingredient. Third, by emphasizing reasonableness, it suggests that critical thinking is not a solitary activity. To say that someone is reasonable is to say that he or she can be reasoned with. One must be open-minded. This does not exclude having settled beliefs and commitments, but it does imply an openness to new perspectives and a willingness to listen to, and possibly learn from, others. Fourth, the definition does not exclude creative thinking:

> Formulating hypotheses, alternative ways of viewing a problem, question, possible solution, and plans for investigating something, for example, are all creative acts that come under this definition. (p. 1)

Ennis's taxonomy of critical thinking skills is actually broader than his definition of "critical thinking" suggests. For example, it includes dispositions to seek clear statements of question, to be open-minded, to seek as much precision as the subject permits, to think in an orderly manner, and to be sensitive to the feelings and level of understanding of others. It also includes abilities such as focusing on the context of an argument, detecting unstated as-

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sumptions, clarifying arguments, making inferences from premises, and interacting with others in a reasonable manner.

Although those concerned about critical thinking might quibble with this or that aspect of Ennis's account, something like what he describes is likely to appear on any plausible list. In short, despite variations on the theme, all plausible accounts bear some family resemblance to each other. Granting this, if we agree that something needs to be done to improve the critical thinking of students, we can now ask how is this to be accomplished. Some advocate introducing special courses on critical thinking. Others, such as John McPeck, believe that such courses are seriously misguided; critical thinking, instead, should be immersed in specific disciplines already in place.

McPeck's argument starts from the premise that all **thinking**, critical or otherwise, "is always about some particular thing or subject (let us call this thing X), and that it therefore makes little or no sense to say 'I teach thinking **simpliciter**,' or 'I teach thinking in general but not about anything in particular'." (1985, p. 295) This is an odd objection. Presumably the subject matter of a critical thinking course is critical thinking itself--the various criteria and principles of that sort of thinking we call 'critical.' There is no shortage of textbooks that concentrate on this. These textbooks typically are filled with examples that invite readers to apply criteria and principles of critical thinking. It is true that the content of these examples is not about any one thing in particular. However, it can be about anything in particular--history, science, current affairs, etc. That is, the criteria and principles found in critical thinking texts are generic, cutting across disciplines and venturing into concerns of life that do not fit neatly into any discipline at all.

However, McPeck's view is that claims in behalf of generic criteria and principles of critical thinking are greatly exaggerated. Critical thinking skills, he holds, vary greatly from discipline to discipline. For example, apparently he believes that there is only a loose relationship between induction in history and induction in science. At certain levels this is no doubt true. However, hasty generalization, ignoring unfavorable evidence, and trying to construct a coherent explanation from bits and pieces of evidence seem to have a great deal in common across disciplines. Methods of verification, falsification, and hypothesis construction may have much in common as well.

Ironically, the more McPeck stresses how little different subject areas have in common in regard to critical thinking, the less critical thinking is likely to be encouraged about relationships among these areas. This can only exacerbate the problem of an already fragmented curriculum that makes it difficult for students to make sense of their educational experiences as a whole.

It will hardly do for McPeck to cite the lack of empirical evidence of "transfer-of-training" effects from one discipline to another. Both McPeck and his opponents decry the lack of critical thinking in our schools, colleges, and universities. Common sense would predict a strong correlation between low-level critical thinking and low-level "transfer-of-training." This is the expected consequence of rote-learning in particular disciplines that lack mechanisms for critical self-appraisal. Given the low-level critical thinking that McPeck and his opponents claim is prevalent, it is no wonder that there is little evidence of "transfer-of-training." His hypothesis cannot be tested until the level of critical thinking is significantly raised.

A further point should be made. Many take our present lack of evidence of significant "transfer-of-training" as settling the question of whether separate critical thinking courses are worthwhile. But no thorough testing of this hypothesis has been done. There are at least four kinds of courses that need to be considered -- in isolation and in various combinations:

1) critical thinking courses per se;

2) courses within different disciplines that explicitly teach critical thinking as applied to those disciplines;

3) courses that require the use of critical thinking if students are to do well, but which do not teach critical thinking; and

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4) courses that neither require the use of critical thinking nor teach it.

The present curriculum is dominated by courses of types 3) and 4). Those who teach courses of type 3) complain that their students do not know how to think critically. We should not expect a mix of 3) and 4) to improve critical thinking. So, the issue comes down to whether courses of type 1) or 2) can help. To test this out for "transfer-of-training" we need to do more than compare the impact of type 1) courses on type 3) with the impact of type 2) courses on type 3). We also need to compare both of these with the impact of type 1) and 2) together on type 3). [We may also need to distinguish kinds of critical thinking courses within type 1)--e.g., informal and formal logic courses.]

All of this is complicated by one more factor. We are just beginning to get a handle on how to assess critical thinking. Robert Ennis and Stephen Norris (Norris and Ennis, 1989) carefully point out the limitations of the standard, multiple choice critical thinking tests. They insist that an adequate test should include essay writing. Since this is not done on a wide scale at the present time, it seems premature to draw conclusions confidently in regard to assessment.

So, where does this leave us? At this point we have common sense to guide us. There is a need for critical thinking in history classes, in literature classes, in science classes, and so on. Advocates of special critical thinking courses cannot sensibly claim that such courses in and of themselves take care of the critical thinking needs in the various disciplines.

At the same time, it seems unwise to frame the question about the place of critical thinking in either/or terms. Critical thinking courses may also be quite valuable. But they will mean little unless critical thinking is encouraged in the already established disciplines as well. It might be argued that everything that can be accomplished in a critical thinking course can be incorporated within particular disciplines. As a practical proposal, this seems implausible. There is little reason to think that sufficient time will be taken in particular disciplines to attend to, not only the critical thinking needs peculiar to a given discipline, but also to relationships among the disciplines and to everyday life as well. A course in critical thinking cannot do all of this either. However, contrary to McPeck's worries, I don't hear advocates of critical thinking courses suggesting anything to the contrary.

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END NOTES

[1]What follows is based on my much longer article, "STS, Critical Thinking, and Philosophy for Children," in Paul T. Durbin, ed., Europe, America, and Technology: Philosophical Perspectives, Netherlands: Luwer Academic Publishers, 1991, pp. 217-246.

[2]Ennis and Stephen P. Norris offer the same definition in their Evaluating Critical Thinking, Pacific Grove, CA: Midwest Publications, 1989. There they claim that their definition is a close approximation of what educators generally mean by "critical thinking."

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News in Higher Education

Abstract of Norris, T. (1991). Nonnative English-speaking Teaching Assistants and Student Performance. Research in Higher Education, 32, 433-448.

In recent years, much concern has been expressed about the quality of instruction provided by foreign teaching assistants (TAs) in higher education. Critics of the use of foreign TAs generally argue that they often impeded the learning process because of language barriers. This study examined the effect that nonnative English-speaking TAs had on student performance over five semesters at the University of Wisconsin-Madison. Multiple regression was used to analyze the relationship between student grades and nonnative English-speaking TAs. Only sections where professors were primarily responsible for grade assignment were considered in the study. Sections conducted by nonnative English-speaking TAs achieved statistically significantly **higher** grades.

Further, performance was consistently higher, regardless of the nonnative English-speaking TA's region of origin, the instructional area of course-section, or whether the course-section occurred before or after the implementation of TA training programs. Prior to the implementation of a training program for TAs, students performed significantly better when taught by experienced TAs as opposed to inexperienced TAs.

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The lab hours are 8:00 am to 8:00 pm Monday through Thursday and 8:00 am to 5:00 pm on Friday.

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Prevention Tips for Large Classes

Cheating happens more often in large classes than in small ones. Here are some prevention tips especially useful for dealing with cheating in large classes:

1. In a large crowded classroom, essay exams reduce answer copying, but increase grading time and effort. If a multiple choice test is given, try to prepare several forms of the test. In this way, those who sit next to each other will actually be working on different forms of the test. (The same questions can be arranged in different order, but labeled as different forms and printed on different colored paper to warn students.) This will help prevent students from trying to copy from others.

2. To prevent "ringers" (people hired to take an exam), require identification and student signatures on exams. All students should have photo ID cards. If you plan to check IDs, be sure to note this in your syllabus and warn students before the exam.

3. Require students to sign an attendance sheet when they turn in their exams. Also, count those present at the exam carefully to make sure the number of examinees agrees with the number of exams.

4. If you permit regrading of exams, photocopy exams and quizzes (or at least a sample of them) before they are returned to students to prevent altered answers.

5. Always provide scratch paper. Students need paper for more than calculation. They may want to draft preliminary outlines to essay questions or note some main ideas prior to beginning a multiple choice test. Paper provided by the instructor eliminates the need for checking student paper for crib sheets.

6. Always be most vigilant at the end of the exam period. During the confusion of turning in the exams, try to maintain order and quiet.

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Instructional Exchange

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Western Michigan University, Kalamazoo, MI 49008-5130

Classroom Activities that Address Critical Thinking

The literature on critical thinking is composed not only of articles about characteristics of critical thinking and the best way to address it in the curriculum, but also of articles that report increases in critical thinking based on instructional procedures. We will consider the latter form of critical thinking literature during this second semester. Many of the disciplinary journals have published articles concerning classroom procedures that may enhance critical thinking.

Several disclaimers need to be made about the literature we will report on in the winter issues. First, the definition of critical thinking varies across these studies. In some cases, the definition is unique to a single study, and in others the evidence for student development is the opinion of the author rather than empirical evidence. In other words, this research has a dependent variable problem. However, the dependent variable problem does not necessarily mean that the techniques offered have no merit. It means only that evidence to support the merit of the techniques is relatively weak. Second, the articles report techniques in the context of a specific discipline, e.g., music or biology, which may restrict the range of applications. In other words, there is a setting problem: all of the techniques offered may not be applicable across the board. However, the techniques will most likely apply to a number of situations and, thus, be worthwhile to more than one department. Some activities seem to be applicable to all courses, but only an instructor can make a judgment on application in a course. And lastly, in some cases, the description of the technique is relatively vague. We have tried to be as concrete as possible, but easy application of technique to courses is unlikely.

The worth of the material lies in the possibilities that it opens for instructors. Whether we specifically agree with the definition of critical thinking in an article or not, clearly the aim of the authors is to develop in students the ability to move beyond rote, factual learning -- a good objective.

This issue focuses on activities that can be performed within the classroom, e.g., specific kinds of discussions, questioning strategies by the instructor, etc. Classroom activities for the most part suggest alternatives to lectures that will engage students in problem-solving using disciplinary concepts. The premise of using the activities is that they require students to apply and synthesize material, while lectures may require students only to remember facts. We are not suggesting that all lecturers aim at low level thinking skills. Some individuals design questioning strategies within the lecture format to force students to apply concepts. But without special attention to application of knowledge, students may exit with only rote learning. Classroom organization clearly is important. Other issues will consider assignments that can be used outside the classroom environment.

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Video Presentation
+
Instructor-Guided Discussion

The Biology Department at West Virginia University developed an Introductory Biology Program with instructional procedures structured to transmit information efficiently and allow maximum student practice in applying the information to develop critical thinking. Most teachers would agree that, apart from understanding that information, students should learn how to apply it to solve unfamiliar problems, make predictions and draw conclusions(Moll & Allen, 1982).

The program was designed to devote class meetings primarily to the students' actual observation, analysis, and practice in critical thinking rather than merely to teach them "correct information." To allow sufficient time for these activities and to transmit information quickly and efficiently, they suggest use of short video presentations to provide realistic observations of demonstrations, experiments, and simulations. At the end of each video presentation, the students and instructor discuss observations and derive interpretations and predictions.

In an average class meeting, viewing the video segments takes approximately six minutes. The rest of the time is taken up by discussion. Basically, the instructor initiates questions and guides the discussion but avoids making judgments of the students' interpretations or conclusions. The students are required to make judgments without relying on the instructor for "right" answers. The instructor can continually emphasize the focal points by raising questions. However, the discussions are not open-ended. Instead, class periods should be carefully planned, and instructors should know precisely what is to be accomplished.

Some of the sample questions that will enhance critical thinking are:

*How do you know that? What is your evidence for that statement?

*What hypotheses can you propose here? How would you test them?

*Is that the only way these results can be interpreted? What are some others?

*If you now obtained these data (instructor presents different data) in a second experiment, what would you conclude?

*If you make that interpretation, what are you assuming? What if you assume the opposite?

*Why does that conclusion follow from these data? If I argue (instructor gives argument), then would I draw a different conclusion?

According to the author, developing such skill is generally a slow, sometimes frustrating, process. But the evaluation study of the program, which uses comparison of average pre- and post-test scores on the tests that were designed to measure retention (content recall) and ability to apply information (critical thinking skills), reveals that using the instructional procedures discussed above, students show improvement in critical thinking ability and content knowledge.

Listening + Questioning
+
Classroom Discussion

How can music teachers encourage students to use critical thinking skills? Lenore Pogonowski of Teachers College Columbia University suggests that listening in conjunction with questioning and classroom dialogues can promote critical thinking about music.

Structural dictation, as Pogonowski defines it, can help engage students in developing critical thinking skills about music. Structural dictation is an activity in which students listen to an unfamiliar work, then gen-

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erate musical data about it. The instructor's role in this activity is to present the music and invite students to share their aural perceptions until they arrive at a consensus about the style of the music. Questioning is an important component of this activity. Appropriate questioning from teachers can help students move easily into dialogue about music content and contrasting stylistic elements. By asking broadly conceived opening questions, the teacher can elicit a wide range of student responses. But certain kinds of questions generate critical thinking; other kinds do not. The following are some questions that will help develop critical thinking skills.

*What are some of the predominant musical characteristics of this work?

*Can you suggest the time period in which the piece was written?

*What musical evidence do you hear to support your observation?

Following the broad questions, specific questions can then be posed regarding melody, harmony, cadences, rhythm, etc. As students begin to synthesize a point of view about the work, they are also evaluating the rationales for differing points of view proposed by other members of the class.

Structural dictation stimulates critical thinking in other ways as well: instead of posing questions at the end of a lecture, raising questions before any direct instruction takes place actually challenges students to bring their accumulated musical knowledge into focus in a way that affects their aural analysis.

Role Playing Activity

The ability to analyze controversial issues is an aspect of critical thinking. Jean M. Lown from Utah State University suggests that critical thinking in business can be taught through role playing.

In role playing, the focus of attention is transferred from the instructor to the students. Role playing can help students to integrate course content with other courses and current events in addition to practicing communication and analysis skills. While focusing on a specific issue, the exercise encourages students to recall and apply concepts from related disciplines such as political science, economics, speech, and consumer economics as well as other business courses.

Lown uses the format of a legislative hearing for the activity. The main responsibilities of the instructor are to establish objectives, select an appropriate topic, select reading assignments which present the various viewpoints on the issue, and set guidelines for the role playing situation. Students may choose or be assigned their roles and prepare their testimony prior to the day of the activity.

A group of ten to twelve students is appropriate for conducting a legislative hearing. In large classes, multiple groups holding simultaneous hearings enable all students to participate while the instructor floats among them as an observer. The main characters in the activity are four committee members (of different political affiliations) who preside over the hearing and ask questions of each speaker, vote on the resolution etc., four to six persons (half pro and half con) who offer testimony, and one news reporter for each group. After the hearings are over, the reporter for each group presents news and commentary on the committee vote to the reassembled class. From the reporter's presentation, students may discover what it's like to be misquoted or have their words taken out of context. It can be particularly revealing if the journalists covering the multiple hearings in a large class report different results to the class, thus initiating discussion on whether there is a "right" decision and why public interest issues are controversial.

During the practice, the instructor should focus student attention on the goals and objectives of the exercise. Videotaping will help review the activity and clarify points of discussion.

The author also suggests that role playing be integrated with other class assignments.

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News in Higher Education

Recently Richard Light (1992) reported on a survey of students at Harvard concerning the amount of writing in the undergraduate experience and the effects of writing. He found that students who indicated that they had no writing assignments during a term committed approximately 6 hours per week per course. Those who were required to write more than 20 pages in a course indicated that they committed approximately 11 hours per week to the course. Only about half of the students who wrote no papers indicated that they were engaged in the course and that they perceived the course as intellectually challenging, as opposed to over 90% engagement and perception of challenge by those who wrote more than 20 pages. Assigned writing, then, enhances students' perceptions of course quality as well as develops their writing skills.

The survey of students at Harvard was initiated by a question from a visiting scholar concerning the amount of writing that undergraduates did. While the faculty believed that students wrote a great deal, they had no evidence of exactly how much writing was taking place. The students were asked how many papers they wrote (regardless of length) per academic term. The responses were: 2% no papers, 4% one to three papers, 7% four to six papers, 16% seven to nine papers, and 71% ten or more papers. While we do not have similar data concerning student writing on our campus, a survey of faculty is now in progress of requirements in courses that have been designated as writing intensive by Dr. McCauley for the Undergraduate Studies Council. These data should allow us to make some judgments about the amount of writing we expect in our special courses. Additionally, students were asked about writing assignments in all courses during the December COMP test days. These data will be reported in the February *I/X*.

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The Academic Skills Center offers tutoring in writing for undergraduate students only. The Writing Lab is located in 1039 Moore Hall. Students may be referred for writing help in two different ways: a professor referral or self referral. The referral may result in a regular one- to two-hour-a-week tutoring session or a drop-in session. However, students should be aware that appointments must be made a week in advance for drop-in sessions. Tutoring is available from January 13 to April 10. Tutors can work with students on redrafting papers for any class.

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If you have any questions, call 387-4442.

Teaching Large Classes

The problem for instructors in large classes is to engage a large audience of students in active learning rather than in passive listening. What follows are a few keys to effective instruction in large classes, in addition to some personal experience from your colleagues at WMU.

*Key one: Don't be intimidated. Once the class size exceeds fifty, it does not make any difference how big it gets. You may experience some nervousness which can provide energy. It is important that on the first day of class you establish good rapport with your students by telling them your name and how you intend to run the class, and remove all the ambiguity from such issues as attendance, homework assignments, exams, and methods of contacting you and getting your assistance.

*Key two: Prepare carefully. Be superprepared and rehearse exactly what you are going to write on the board. What will make a lecture successful is not only what you say, but how you say it.

*Key three: Be personal. It is common for large classes to meet once a week in small groups. This will give you a chance to get some student feedback. In the large class make eye contact on different sides of the room and do a lot of moving. Use the PASS system for the reading assignments.

*Key four: Do not take attendance by reading the class list. It is a waste of time. Dr. Dale Porter suggests a short paper, such as "read one chapter and write one page about it every week." Assignments are a way to get students involved and for you to keep attendance.

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Written Assignments that Address Critical Thinking

In January, we presented some activities that could be used within a class period to enhance critical thinking. In this issue, we are going to focus on published articles concerning out-of-class written assignments and projects that encourage students to develop critical thinking skills.

Out-of-class assignments have several advantages compared to in-class instructor-guided learning activities: practice time can be greatly extended, individual rather than group work can be stressed, and additional opportunities for feedback from instructors can be provided. As a matter of fact, instructors' comments on students' papers may encourage critical thinking skills by both supporting and challenging students' ideas.

Every instructor assigns certain kinds of assignments or projects to his/her students. But some kinds of assignments will help to enhance critical thinking skills, while some don't. Therefore, it is important for instructors to design assignments appropriate for their course or discipline, which will encourage students to apply the concepts and information derived from class presentations and readings, to analyze controversial issues, to judge and evaluate different kinds of viewpoints, and to think critically instead of simply copying down whatever is said in the textbooks.

Although instructors agree that students in all courses should be encouraged to develop discipline-related thinking skills, they are often uncertain how thinking-skill development can be integrated into a course without sacrificing its content. Many faculty members are reluctant to adopt new techniques because empirical evidence is lacking about their effectiveness. In this issue, we are going to introduce some kinds of assignments that help to develop critical thinking skills while developing disciplinary knowledge -- reader's response journals and the analytic essay for writing or humanities courses and practice exercises for biology or similar science courses. These assignments and exercises have been used very successfully and proved to be effective in helping students to become critical thinkers.

However, as we explained in January's issue, an easy application of the techniques and formats described is not likely. Different disciplines will require different focal points on the assignments. The point is that instead of mere factual learning and recall, students should be challenged to go deeper into the issues and explore them. In conjunction with classroom instruction and practice activities, appropriate out-of-class written assignments and projects will definitely enhance students' critical thinking.

In March, we are going to focus on organizational strategies for lectures that will help to encourage students' critical thinking skills.

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Response Journal and Analytic Essay

Lucille C. Bruch of Findlay College teaches separate courses in critical thinking and composition. She has spent much time trying to construct assignments which will embed one discipline in the other. She uses many types of assignments to try to achieve the integration of thinking and writing. She found two kinds of assignments most useful in getting students to start merging careful thinking with careful writing. They are the reader's response journals and the analytic essay. These two projects necessitated close contextual readings, thorough understanding, and the ability to synthesize written materials and personal ideas.

The Reader's Response Journal

Response journals can be used to encourage students to investigate their own perceptions concerning people, events, and beliefs through writing. The journals can also provide a specific location for students to record on a regular basis their reactions, questions, and comments about literature, essays, or other reading assignments. The process of defining forces students to focus their attention on the issues. As these issues are further probed, presumptions are identified, tested, and reconstructed, and students begin to reevaluate their beliefs or knowledge.

One of the most successful journal assignments Bruch has given involved Robert Penn Warren's All the King's Men. For this project, she handed out a worksheet with some specific questions designed to focus student attention directly on specific issues. The two questions she found that activated the most critically composed responses were: **Does the end ever justify the means?** and **Does the truth ever set one free**? The questions seemed to challenge most of the class. Writing in the journals gave students the opportunity to explore not only the motivations, actions, and implications of actions of the characters in the novel but for themselves as well.

Journals don't always have to be written after a reading assignment. They can also be assigned before the piece is read, concentrating attention on expectations and stereotypical situations. Students will be asked to complete a "mapping" assignment, listing their answers to the questions raised by the instructor about the reading. For example, before they read All the King's Men, Bruch asked her critical thinking class to imagine themselves in a situation where they wanted something very badly and had the information to destroy the only person standing in their way. She asked the students what they would do in this predicament? How would they feel? Would they ever use the information to destroy another person to attain their own goal? After the students read the novel, they completed a second map. By looking at the differences between the two maps, the students were able to perceive many things about themselves and about their fictional counterparts.

Finally, students were asked to comment in their journals upon this entire exercise and to share any conclusions they might have reached. Critical thinking is therefore combined with critical writing.

The Analytic Essay

The second kind of assignment Bruch used is the analytic essay. In this kind of project, students are asked to write about their own personal experiences after they have read a book or an essay that focus on a specific topic. For example, in class, students read an essay by Roberto Acuna from Studs Terkel's Working in which Acuna describes how the things he saw shaped his life. After discussing this essay, Bruch asked her students to write about a shaping experience of their own, describing the experience and explaining how it had shaped their lives.

The students were asked to read their drafts to a peer group of 5 or 6, and members of the group gave written suggestions and comments to each author. One of the tasks each group member had was to identify for the writer the central assertion of the paper

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and the main premises on which this assertion was founded. This helped the peer group members develop skills in analysis of arguments. The author then collected all the comments, took home the draft, and revised it to his/her own satisfaction. These papers were then submitted for grades.

In this exercise, students have to include explicit supporting data illustrating their claim that this particular experience had shaped their lives. Peers' instant feedback provides a very good source for authors to make revision. The written product strengthens the ability to develop and present an argument.

According to Bruch, both kinds of assignments described above resulted in her students' displaying more precise organization, a greater awareness of a specific ambience, a substantial increase in logical development, a greater willingness to explore thought through writing, an increased ability to analyze and evaluate, and a more powerful style of prose.

Practice Exercise

During the past few years, science courses have been designed to improve student skills at intellectual levels more advanced than mere memory-recall. Many assignments and projects have been designed to ensure maximum student involvement and active participation in the learning process.

Walter R. Statkiewicz and Robert D. Allen from the Department of Biology of West Virginia University introduced practice exercises they used for their classes. After each class meeting, students are given three or four problems relevant to the material from the class. These problems are in a multiple-choice format, but instead of simply selecting a choice, students are required to write out a full justification for accepting or rejecting each choice. Acceptable justifications must apply concepts and information and establish a well developed and clearly expressed line of reasoning leading to acceptance or rejection. The criteria for a good justification are:

*Appropriate concepts and information are applied correctly.

*Arguments are stated in such a way as to eliminate any other reasonable argument(s). Students should recognize that there may be considerations for and against a choice, and they should address both in their own argument.

*Arguments for and against the different choices are consistent. For example, students will sometimes argue that a choice should be eliminated because of insufficient data, yet will select another choice that has no more supporting data.

According to the authors, a multiple-choice format has the advantage of forcing students to examine different points of view on a problem. Students will often fail to do this on an open-ended problem. Providing choices can also substitute for teacher guidance and increase the effectiveness of the problems as out-of-class exercises.

In general, students are encouraged to approach the problems by using information given in the problem and information derived from class presentations and readings. Information from both sources must be used in the analysis to reach the required solutions.

Four sample problems are presented in the article. Due to lack of space here, we have to leave out the samples. But full reference to the article is provided. The findings indicate that students' analytical skills do improve with practice and that these skills are transferable to new and unfamiliar problems. Developing analytical reasoning with science concepts is an important but difficult goal to achieve, and the use of written practice exercises of the type described can provide a valuable step toward realizing the goal.

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Writing during the Senior Year

A survey was administered during the make-up test days of senior assessment at Western Michigan University during fall semester, 1991, concerning the amount of writing required in courses and the amount of challenge perceived by the student. The questionnaire was modelled after the questions asked of Harvard undergraduates. Out of the 210 students at the COMP, 178 completed questionnaires that could be analyzed. While the rate of return would indicate a very good sample, it should be pointed out that the students who wait until the last minute to take their assessment test are not typical students and generally have lower GPA's than other students. The questionnaire did not ask students to identify their major. Consequently, we cannot describe the sample in terms of major. However, courses from every college were reported by the sample of students.

The students listed each course in which they were enrolled; indicated the number of papers required for the course, the number of pages for each of the papers, and the amount of time they devoted to the course; and rated the course on a 5-point scale from 1 = not challenging to 5 = very challenging.

The first level of analysis that can be performed is at the term-enrollment level. The average number of courses that each student was enrolled in was 4. The vast majority of students were taking 3, 4, or 5 courses (19%, 33%, and 25% respectively). Half of the seniors wrote 27 or more pages. Thirteen percent wrote no papers during the term. In reporting weekly study time, half of the seniors indicated that they studied 13 hours per week or less.

A second way to look at the information is analysis at the course level. The average number of papers indicated per course was 1.7, but the distribution of papers was quite skewed -- no papers 44%, one paper 20%, two papers 11%, three papers 7%, four papers 6%, and five papers 4%. The large number of reported courses with no papers may be because students differentiated between project reports and papers. Another explanation may be the large number of students in "field experience" or "senior capstone" experiences where a typical research paper is not required. Our sample of courses is slightly different from the Harvard sample where all science and quantitative courses were excluded. We excluded no departments since the senior writing requirement is in place in all departments. The average length of a paper across all courses was 10 pages. Approximately half of the students who reported writing papers wrote papers between one and 14 pages in length. Students reported studying approximately 5 hours per week for a course.

The average challenge rating over all courses was 3.5, slightly above the middle of the scale provided for rating. The relationship among papers, study time, and challenge found on our campus was similar to that found at Harvard. There was a positive relationship among the reported number of papers, number of pages in the papers, time applied for studying for the course, and rating of challenge. That is, courses which involved papers were reported as more challenging, and more time was allocated for study. The shift in the rating of challenge did not seem to occur at the high end of the rating. Twenty-five percent of the courses with no papers were rated as very challenging, whereas 30% of the courses with one paper and 28% of the courses with two papers received the highest rating. The shift in rating is dramatic at the low end of the challenge report. Twelve percent of the courses with no papers were reported as not challenging, whereas 7% of the courses with one paper and 3% of the courses with two papers received the lowest rating. Open-ended comments from the students indicated that papers allowed them to synthesize the material and "appreciate" the subject matter.

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Instructional Exchange

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Office of University Assessment
Western Michigan University, Kalamazoo, MI 49008-5130

Strategies for Introducing Critical Thinking Skills

If critical thinking is a skill separate from knowledge in a particular subject matter, then it can be taught either as a separate skill or as a skill integrated into each of the subject matters. Much as a Physics professor may teach a mathematical operation as a component of a physics concept or a Marketing professor may teach persuasive writing, critical thinking skills can be integrated into the disciplines. But just as the Physics professor must explicitly teach the necessary application in mathematics if the students don't know how to do it, teaching critical thinking is more than just telling your class to be critical as they read material or write essays and papers. To the naive person, being "critical" means finding fault or just simply not agreeing with something.

Critical thinking may be composed of a number of skills that allow a person to focus on the evidence presented and to decide what to believe. Instruction in critical thinking skills can be integrated into instruction in various subject matters when critical thinking skills are used to enrich knowledge and understanding of the discipline. Some may object to the integrated approach to teaching critical thinking because it takes time away from the teaching of the discipline itself. Others argue that teaching critical thinking within subject matter is essential because the skills of critical thinking differ across subject matters. Therefore, one must learn critical thinking in each subject area.

This issue shows two different methods to teach a critical thinking skill explicitly: as subject material is being presented and discussed or as a separate component of a class. Unlike activities designed to allow students to practice higher order thinking skills, discussed in January, the premise of this issue is that an instructor decides to teach a particular aspect of critical thinking explicitly within his or her course either in conjunction with other subject matter or as a separate skill that will be useful in a discussion of the subject matter.

You may find nothing new in these recommendations for presentations because they are nothing more than the two major ways of making presentations -- induction and deduction or, if you prefer, discovery and didactic presentation. However, the inductive example is provided because it shows a critical thinking skill can be taught at the same time as material in the subject matter. (The subject in the example is history.) The didactic presentation examples show the explicit presentation of teaching argument analysis, which may be an objective of instruction in a number of courses outside of philosophy.

Additionally, discussion of the two styles of teaching gives us an opportunity to think about how much variation in style we use in the classroom. Do all presentations of new material have to be expository and didactic? What aspects of the content can be presented inductively?

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Inductive or Discovery Method

Barry K. Beyer, a social science professor at George Mason University, developed strategies for teaching critical thinking because he found the arguments of educational researchers compelling. Educational researchers have pointed out repeatedly that learning how to think is not an automatic by-product of studying certain subjects, assimilating the products of someone else's thinking, or simply being asked to think about some subject or topic. Nor do students learn how to engage in critical thinking effectively by themselves. Beyer concluded that if students are to become proficient in critical thinking, social science teachers must use more direct instructional methods. The attitude, skill, and knowledge components of critical thinking must be established as explicit goals of instruction.

Beyer (1985) suggests that teachers can improve student learning of critical thinking skills by organizing instruction in each skill in a five-stage framework derived from the research findings. Each stage is important to effective instruction and learning. However, the most important stage is the first, when students are introduced to the skill in detail. To be most effective, in the introductory stage, focus should be placed on the attributes of the skill itself.

Teachers can introduce a skill inductively by letting students identify the key attributes of the skill while or right after they attempt to use it. Once its attributes have been articulated and discussed, the lesson can conclude with a second application of the skill. Thus, during the lesson, professors provide students with practice in applying the critical thinking skill.

An Inductive Introduction

In executing this inductive strategy, teachers and students proceed through five major steps.

1. First, the teacher introduces the skill by a simple definition, but does not elaborate on the importance of the skill or the variations of the skill.

2. Then the students experiment with using it, as best they can.

3. The instructor draws the class into a summary of the use of the definition. Students are encouraged to reflect on and articulate how they tried to apply the skill to generate principles of the skill. During the summary discussion, the instructor points out principles that the students have discovered.

4. Students are given another opportunity to apply their new knowledge of the skill by using the skill again.

5. Finally, the instructor reviews the application of the skill to check the principles of use.

Suppose one wanted to teach the critical thinking skill of detecting bias in written documents. This skill could be introduced in a world history course when students have studied the case of England's late 18th century industrial revolution and are about to investigate its results.

In step 1, the teacher states the label of detecting bias or has the students define it on the basis of common sense, gives a synonym or two, and identifies several examples.

In step 2, given an excerpt from a document, students determine the impact of the industrial revolution. But they are asked to examine it to see if it is biased without a detailed description of the characteristics of bias.

In step 3, students explain why the document is biased if they think so. And in reporting on how they decided that the account is biased, students readily identify most of the clues to the existence of bias. They also identify some procedures to use in finding clues and making sense of them. As this occurs, students begin to articulate inductively some of the major attributes of the skill of detecting bias. They can discuss the various forms of bias and decide which are most critical when considering the evidence of the effects of the industrial revolution. In this step, not only is the critical thinking skill practiced, but the content matter is discussed.

In step 4, the students will deliberately apply and "test out" the clues and procedures they have just inferred by using another documentary excerpt.

About Instructional Exchange

Instructional Exchange (I/X) is published six times per year during the fall and winter semesters. The purpose of I/X is to provide a forum for the exchange of information about instruction at Western Michigan University.

The newsletter is published by the Office of University Assessment. Comments and exchanges can be directed to the I/X staff at University Assessment (Room 2010 Administration Building, ph: 7-3031) or through the VAX system addressed to BUNDA.

Editor: Mary Anne Bunda Managing Editor: Marcia Mascolini
Production Editor: Jie Gao

1. What did you like about Instructional Exchange?

2. Which articles did you find useful?

3. What didn't you like about the newsletter?

4. Do you know of innovations or practices on campus that should be highlighted in coming issues? If so, what are they?

5. Would you be willing to write an article about teaching and learning at Western on a topic of interest to you? If so, what topic? (Also, please identify yourself if you would be willing to write.)

6. Are there other topics you would like to have addressed next year? Please list.

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Finally, in step 5, the students can review what they did as they used - for the second time - the clues and procedures of detecting bias. They can also judge the quality of evidence, as they have identified it so far, to clarify the components of this particular skill. Also, the discussion enhances students' understanding of the industrial revolution based on the evidence of the effects they are considering.

By engaging in the five steps - introduction, experimentation, reflection, application, and review - students and teacher invent or discover some major attributes of the skill and begin to learn deliberately how to execute it as they learn about the characteristics of a major event in history.

Didactic or Explicit Presentation

In a situation where a new skill is rather complex, or when the students need specific guidance in successfully engaging in a skill, a more direct introduction may be useful. The professor prepares a lesson which explicitly defines the skill, provides examples of the skill, and provides an opportunity for the students to practice the skill as defined. The students are responsible for learning to apply the skill accurately rather than to develop a definition and apply the skill.

A Directive Introduction

To use it, the teacher:

1. introduces the skill in all of its complexity
2. explains the procedure and rules of the skill
3. demonstrates how the complex skill is used in situations designed to highlight each of the components of the skill; and then,
4. under the guidance of the instructor, the students apply the skill in a relatively simple situation following the explained procedure and rules, and
5. reflect on the skill as the skill is executed when the instructor summarizes the critical elements of the skill.

This directive strategy can also be used to introduce world history students to the critical thinking skill of recognizing fallacies in arguments. (Cederblom & Paulsen, 1991)

In step 1, the teacher can introduce the skill by naming it, writing its name on the chalkboard, and defining it by examples and synonyms. By going through this introductory phase, the teacher allows students time to deal with this skill by recalling anything they might know about fallacies and by making connections to previously learned or related knowledge or experience. The teacher points out the benefits of the skill even beyond the classroom. Fallacies such as ad hominem or tu quoque might be shown to relate to debates outside of the classroom.

In step 2, the teacher lists clues that distinguish the kinds of fallacies and outlines a procedure by which students can execute the skill. Material prepared for this practice is relatively simple, illustrating one component of the detection of fallacies at a time. For example, a list of key words such as "so, thus, therefore, hence, consequently" may be provided to help students identify conclusions so that the elements of an argument are explicitly separated. Students often misread conclusions for summary statements of the premises of an argument. The steps of application are also presented to the students.

In step 3, using an example designed to show the complexity of the skill, the teacher can demonstrate how the skill works by walking the students step-by-step through the use of this skill and reviewing what they did after they have finished.

In step 4, the students take over. Individually or in pairs, they can apply the skill as modeled by the teacher to examine a second example of arguments or conclusions, purposefully employing the procedures, rules, and clues presented and demonstrated by the teacher. For example, students are asked to state, and find evidence to support, the extent to which the source examined has overgeneralized or used irrational appeal. This is a complex task rather than the simple identification of premises and conclusions. If the discussion is taking place within a discipline, the professor should explain how an appeal to authority can be used fallaciously or how research evidence may be misapplied.

Finally, in step 5, students should reflect on what they did in executing the skill in order to articulate its essential attributes. Such reviews serve to set up further learning that requires the use of the newly introduced skill to achieve further content objectives.

Another example from Priscilla Agnew (1986), who teaches philosophy and informal logic classes at Saddleback College, will also help to illustrate this strategy. Agnew has developed a Critical Thinking

Worksheet for introducing critical thinking that she has used in her presentation to beginning students of philosophy and informal logic.

In step 1, a handout introduces essential terms such as "argument," "conclusion," and "reasons or premises." The definitions are given and examples of each are shown. The variations in arguments are shown. The relationship of the premises to the conclusions is given.

The worksheet itself constitutes the second page of the handout. After the brief introduction of those essential terms, students are asked to identify the premises and conclusion in a brief paragraph on smoking. According to Agnew, the narrative given for the first example should be a subject with which all students are familiar and about which they already have an opinion. This allows them not only to apply the rules of argumentation to the narrative, but also to look for fallacies on the basis of their own opinions.

Then, the worksheet guides discussion through the steps in the process of critical thinking, covering ambiguous terms and the truth or falsity of the premises. Students are taught how to distinguish them so that they will be able to get started on the verification of the premises. Given examples, students are asked to consider whether the statement is true, false, or uncertain. Then they have to provide comments and offer evidence for the truth of the statement or specify the information needed to verify the statement.

Furthermore, the worksheet also guides discussion on the use of emotive tone, appeals to pity, prejudicial language, the fallacies in the argument, counterarguments, etc., so that students will be prepared to judge the strength of arguments. Students are encouraged to do a summary assessment and express their own view on the worksheet.

Additional handouts provide students with assistance in verifying the truth or falsity of the premises of an argument and in identifying kinds of fallacies, such as hasty generalizations, false causes, arguments resting solely upon the strength of an authority, arguments against the person making the claim rather than the claim itself, and appeals to emotion. These concepts would, of course, also be covered in the textbook used by Agnew.

Finally, after using the worksheet with the smoking argument, students were asked to write on a new topic and provide their own examples. At this stage, students have the overall picture in mind and are able to reflect on and practice the skills learned.

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This is the last issue of I/X for this academic year. Your ideas and comments last year were most helpful in the development of Volume 3.

We appreciate candid comments about faculty likes, dislikes, and desires.

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